

A REVIEW OF THE INDO-PACIFIC MEMBERS OF THE
DEEP-WATER CHAUNACID ANGLERFISH
GENUS *BATHYCHAUNAX*, WITH THE DESCRIPTION
OF A NEW SPECIES FROM THE EASTERN
INDIAN OCEAN (PISCES: LOPHIIFORMES)

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ABSTRACT

Twenty-one chaunacid specimens collected by Soviet vessels in the eastern Indian Ocean represent the first Indo-Pacific records of the recently described genus *Bathychaunax*. Eleven of the specimens are similar to the other nominal *Bathychaunax* species, *B. coloratus* (Garman) of the eastern Pacific, and *B. roseus* (Barbour) of the western Atlantic, and are tentatively assigned to *B. coloratus*, previously known only from the type. The remaining 10 specimens are quite distinctive in having a very long tail and in being the only chaunacids with a black buccal cavity. These specimens are compared with all known *Bathychaunax* specimens and are herein described as a new species.

During the investigations of the deep-sea fauna of the Indian Ocean, research vessels from the Soviet Union obtained 21 specimens of the newly described chaunacid anglerfish genus *Bathychaunax* Caruso (1989). These represent the first Indo-Pacific record of this genus. *Bathychaunax* is distinguished from *Chaunax*, the only other chaunacid genus, by its lower lateral-line counts; longer illicium; wider head; larger, more widely spaced dermal denticles; and by several osteological characters (Caruso, 1989). The genus is currently represented by the type species, *B. coloratus* (Garman, 1899) of the eastern Pacific Ocean, and *B. roseus* (Barbour, 1941) of the western Atlantic Ocean. Eleven of the Soviet specimens are similar to their nominal congeners, but 10 are very different from any known chaunacid species. It is the purpose of this paper to: 1) propose the hypothesis that the 11 specimens that are similar to their nominal congeners represent the first Indo-Pacific record of *B. coloratus*; 2) redescribe *B. coloratus* based upon this new material since the species was heretofore represented solely by the single type specimen; 3) propose the hypothesis that the remaining 10 specimens represent a distinct, hitherto undescribed species.

MATERIALS AND METHODS

The methods used for counts and measurements in this study follow those presented in Caruso (1989). Standard length (SL) is used throughout and was measured in the conventional manner. Other measurements and counts of lateral line organs are unconventional and follow those described in Caruso (1989). Of these measurements, the following were most useful in distinguishing the species of *Bathychaunax*: 1) intersphenotic width (ISP), the distance between the anterolateral angles of the sphenotic bones; 2) tail length (TL1), the distance between the urogenital papilla and the end of the hypural plate; 3) the distance between the posterior end of the soft dorsal fin base and the hypural plate (TL2); and 4) the distance between the posterior end of the anal-fin base and the hypural plate (TL3). All measurements of bilateral structures were taken on the left side, and all measurements were taken with a dial calipers to the nearest 0.5 mm. When necessary to insure accurate counts, incisions were made in the skin to reveal the bases of dorsal, anal, and pectoral fin rays. Radiographs were prepared with soft-ray equipment at Gulf Coast Research Laboratory. Terminology used in discussing the angling apparatus follows Bradbury (1967), and institutional abbreviations follow Leviton et al. (1985).

All Indian Ocean specimens were obtained on loan from the P. P. Shirshov Institute of Oceanology of the Academy of Sciences of the USSR, the Zoological Institute in Leningrad, and the Zoological

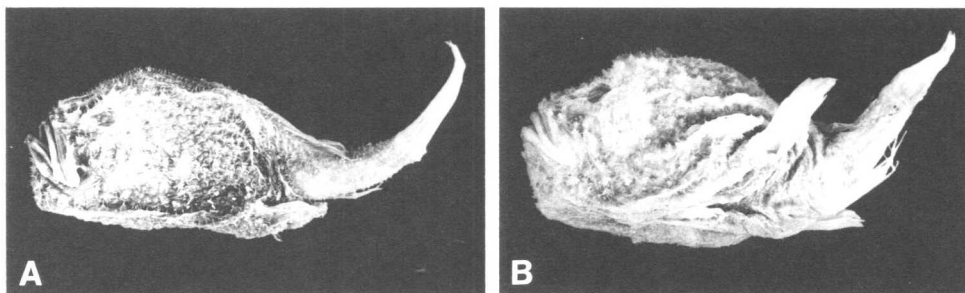


Figure 1. Similar sized specimens of (A) *Bathychaunax melanostomus* holotype, ZIL 48575, 100 mm, female; and (B) *Bathychaunax coloratus* ZIL 48574, 103 mm, male.

Museum, Moscow State University. Comparative material of *B. roseus* (listed in Caruso, 1989) was obtained on loan from the Virginia Institute of Marine Science.

***Bathychaunax melanostomus* new species**

Figures 1A and 2

Material Examined.—10 specimens (49–100 mm).

Holotype.—ZIL N 48575, 100 mm, female; PROFESSOR MESIATZEV Cruise 7, Sta. 45, 16°55'S, 114°53'E, 1,600–1,700 m, 24 April 1979.

Paratypes.—MMSU P-17478, male, 62 mm, PROFESSOR MESIATZEV Cr. 7, Sta. 11, 14°57'S, 86°49'E, 1,760 m, 19 March 1979; MMSU P-17403, 4 (49–72 mm), PROFESSOR MESIATZEV Cr. 7, Sta. 17, 19°45'S, 87°54'E, 1,560–1,650 m, 22 March 1979; MMSU P-17404, 3 (48–71 mm), PROFESSOR MESIATZEV Cr. 7, Sta. 20, 30°22'S, 88°44'E, 1,320 m, 28 March 1979; MMSU P-17405 (paratopotype), male, 53 mm, PROFESSOR MESIATZEV Cr. 7, Sta. 45, 16°55'S, 114°53'E, 1,600–1,700 m, 24 April 1979.

Diagnosis.—A species of *Bathychaunax* distinguished by the following character states: buccal cavity black (Fig. 2), and tail long, with appressed anal-fin rays falling far short of posterior end of hypural plate.

Description.—In preservative, skin over entire head and body devoid of pigment and translucent, skin appears slate blue to black over head and body, and pale to dark tan on tail, cheeks, and posterodorsal surface of head where muscles show through skin; median and paired fins dark greyish tan, interradial membranes transparent on median fins, translucent on paired fins; illicium and esca pale tan

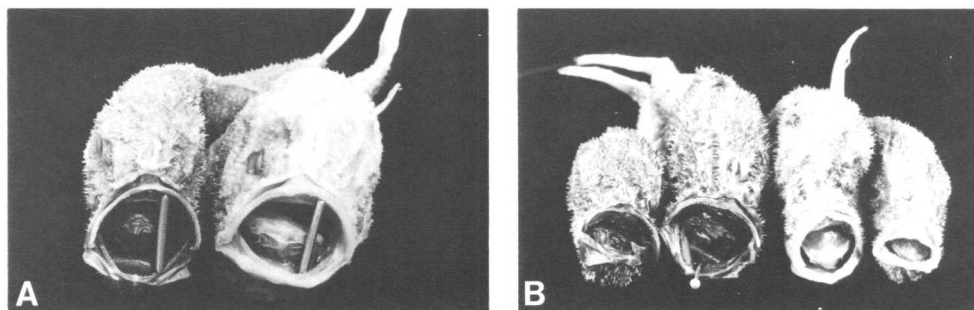


Figure 2. Mouth pigmentation in *Bathychaunax melanostomus* and *B. coloratus*. A) *B. melanostomus* (left; holotype, ZIL N48575, 100 mm) and *B. coloratus* (right; ZIL N48574, 150 mm). B) *B. melanostomus* (two left specimens; paratypes, MMSU P-17404, 63, 71 mm) and *B. coloratus* (two right specimens; MMSU P-17409, 50.5, 58.5 mm) taken in the same trawl sample.

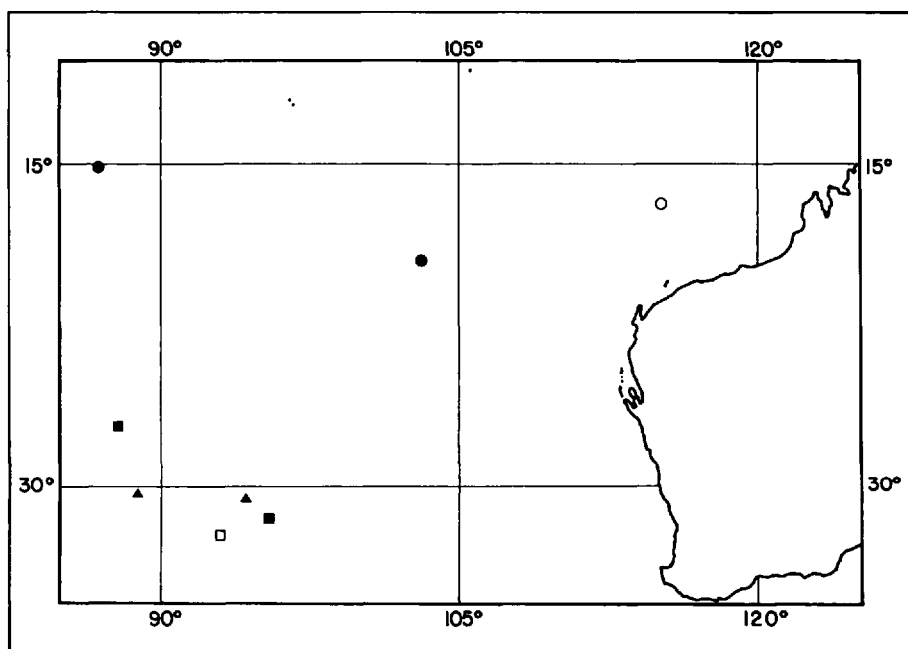


Figure 3. Map of the eastern Indian Ocean showing distribution of *Bathychaunax melanostomus* (circles) and *B. coloratus* (squares) specimens examined in this study. Open symbols are type localities; triangles represent localities where both species were collected.

or grey; illicial cavity flat anteriorly, very slightly concave or with a slight ridge at posterior border; inside of buccal, branchial, and body cavities (parietal peritoneum) black; all fin rays except caudal unbranched, caudal-fin with two outer rays unbranched, six inner rays branched; vomer with few lateral teeth, palatines with few anterior teeth; ISP narrow (20.7–24.3% of SL); tail long (TL1 = 43.5–52.6% of SL, mean = 47.1%), appressed anal-fin rays well short of hypural plate; TL2 and TL3 long (TL2 = 25.1–29.5% of SL, mean = 27.2%; TL3 = 23.2–28.9% of SL, mean = 25.9%); dorsal-fin rays 11 (holotype with 10 rays, several of which are deformed, suggesting recovery from an earlier injury); anal-fin rays 6; pectoral-fin rays 12–15; vertebrae 19.

Distribution.—*Bathychaunax melanostomus* is currently known only from the eastern Indian Ocean (Fig. 3). It has been taken between 14°S and 30°S, and 86°E and 114°E at depths ranging from 1,320–1,760 m.

Etymology.—The name *melanostomus* alludes to the black pigment lining the buccal cavity that is unique to this species among the currently recognized chaunacid species.

Comment.—A female specimen was chosen as the holotype for this species despite deformities in the dorsal-fin rays for the following reasons: 1) it seems to have suffered the least amount of distortion from collection and preservation, 2) it is the only one of the ten *B. melanostomus* specimens from which all neuromast counts could be made with accuracy, 3) it is the largest known specimen.

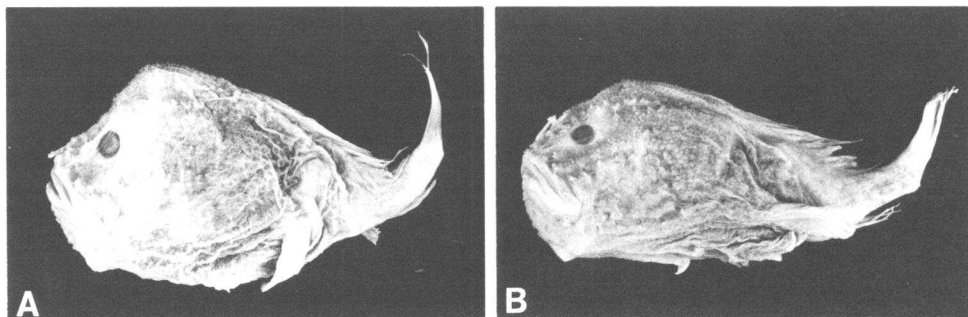


Figure 4. Similar sized specimens of (A) *Bathychaunax coloratus* MMSU P-17409, 142 mm, female; and (B) *Bathychaunax roseus* VIMS 04232, 128 mm, female.

Bathychaunax coloratus (Garman)

Figures 1B and 4A

Chaunax coloratus Garman, 1899: 83 (original description; single specimen, holotype MCZ 28734, 190 mm, male, Pacific Ocean, ALBATROSS Sta. 3363, 5°43'N, 85°50'W, 1,789 m, 26 Feb. 1891).

Bathychaunax coloratus: Caruso, 1989: 156 (new combination; revision Atlantic chaunacids; description *Bathychaunax*, *C. coloratus* designated type species).

Material Examined.—12 specimens (47–190 mm).

Holotype.—MCZ 28734, 190 mm, male, Pacific Ocean over Cocos Ridge (complete data listed above).

Additional non-type material (11 Indian Ocean specimens, 47–150 mm).—ZIL N 48574, 103 mm, male, PROFESSOR MESIATZEV Cruise 7, Sta. 35, 32°16'S, 97°56'E, 1,733 m, 4 April, 1979. MMSU P-17406, 150 mm, female, ZVEZDA KRYMA Cr. 6, Sta. 134, 31°32'S, 95°25'E, 1,250 m, 19 Sept. 1976; MMSU P-17407, 2 females (98, 101 mm), ICHTHYANDR Cr. 4, Sta. 50; 30°45'S, 94°16'E, 1,425 m, 18 March 1978; MMSU P-17408, 59 mm, PROFESSOR MESIATZEV Cr. 7, Sta. 18, 27°38'S, 87°40'E, 1,340–1,380 m, 26 March 1979; MMSU P-17409, 5 (47–142 mm), PROFESSOR MESIATZEV Cr. 7, Sta. 20, 30°22'S, 88°44'E, 1,320 m, 28 March 1979 (collected with three *B. melanostomus*); MMSU P-17410, 122 mm, female, PROFESSOR MESIATZEV Cr. 7, Sta. 28, 30°36'S, 94°24'E, 1,400 m, 4 April 1979.

Diagnosis.—A species of *Bathychaunax* distinguished by the following character states: buccal cavity not black, dusky in young becoming pale with age (Fig. 2); tail of moderate length, appressed anal-fin rays reaching or nearly reaching posterior end of hypural plate.

Description.—In preservative, skin over entire head and body devoid of pigment and translucent, skin appears pale blue-grey on head and body, and pale pink or pinkish tan on tail, cheeks, and posterodorsal surface of head where muscles show through skin; median and paired fins pale pinkish tan, interradiial membranes transparent on smaller specimens, becoming translucent with age; illicium and esca pale pinkish tan; illicial cavity flat anteriorly, slightly concave or with a slight ridge at posterior border; inside of buccal cavity dusky in young, becoming pale with age; parietal peritoneum black; all fin rays except caudal unbranched, caudal-fin with two outer rays unbranched, six inner rays branched; vomer with two prominent patches of small teeth, palatines with few anterior teeth; ISP wide (23.4–26.9% of SL); tail short (TL1 = 33.6–44.4% of SL, mean 38.2%), appressed anal-fin rays reaching to or nearly to hypural plate; TL2 and TL3 short (TL2 = 18.4–21.7% of SL, mean = 20.2%; TL3 = 15.5–22.7% of SL, mean = 19.4%); dorsal-fin rays 11; anal-fin rays 6 (one specimen 5); pectoral-fin rays 11 or 12; vertebrae 19.

Table 1. Measurements expressed as percent of standard length for *Bathychaunax* minimum and maximum values are followed by the mean. (For abbreviations, see Materials and Methods)

Species	N	ISP	TL1	TL2	TL3
<i>B. coloratus</i>	6	23.4–26.9 24.7	33.6–44.4 38.2	18.4–21.7 20.2	15.6–22.7 19.4
<i>B. melanostomus</i>	6	20.7–24.3 22.5	43.4–52.6 47.1	25.1–29.5 27.2	23.2–28.9 25.9
<i>B. roseus</i>	4	23.4–24.2 23.8	28.0–37.1 31.2	15.4–18.4 17.0	13.7–15.9 15.2

Distribution. — *Bathychaunax coloratus* is currently known from the eastern Indian Ocean (Fig. 3), and the type locality on the Cocos Ridge in the eastern Pacific Ocean (5°43'N, 85°50'W, 1,789 m). In the Indian Ocean, it has been taken between 16°S and 32°S and 87°E and 97°E at depths ranging from 1,250–1,733 m.

Comments. — Garman (1899: 86) described the color of the freshly caught holotype as “a deep rose, tinted with blue to blackish around the angles of the mouth and on the orbit around the eye.”

Note variation in head shape illustrated in Figures 1B and 4A. Although these specimens are of different sizes and sexes, this variation is not attributable to any known form of polymorphism. It has been observed in other *Bathychaunax* and *Chaunax* species and it appears to be an artifact of preservation.

Discussion. — With its very long tail and black buccal cavity, *B. melanostomus* (Figs. 1A, 2) is the most distinctive member, not only of its genus, but of its family as well. Furthermore, since it is sympatric with one of its congeners, the hypothesis that even the small sample available for this study represents a distinct species seems highly corroborated.

The remaining *Bathychaunax* populations provide an excellent example of the classic taxonomic problem of morphologically similar allopatric populations. The eastern Indian Ocean population of *B. coloratus* (Figs. 1B, 4A) has a tail of moderate length (Table 1), and like other chaunacids, a pale buccal cavity (Fig. 2). The eastern Pacific population of *B. coloratus* is known solely from the holotype (MCZ 28734) which unfortunately “has suffered from ruthless dissection” (Barbour, 1941: 8) so that the only data that could be obtained were standard length, fin-ray counts, and three neuromast counts (infraorbital, and upper and lower preopercular). The western Atlantic species *B. roseus* (Fig. 4B) (currently represented by eight specimens) may be distinguished from its congeners by its very short tail (Table 1) and its palatine teeth which are reduced in number or absent altogether. There are also significant differences in the color of fresh specimens of *B. coloratus* and *B. roseus* as described by Garman (1899) and Barbour (1941).

Neuromast counts show little intraspecific or interspecific variation in *Bathychaunax*. These data, taken from 19 of 30 specimens (from which accurate counts could be made) representing all three species are as follows (see Caruso, 1989, for definitions): supraorbital 9 (2 with 10), infraorbital 4 (7 with 5), mandibular 4 (1 with 3, 1 with 5), hyomandibular 4 (2 with 3), pectoral 3, premaxillary 6 (1 with 5), maxillary 2 (1 with 1), supratemporal 6 (1 with 7), upper preopercular 1, lower preopercular 2, upper mental 8 (1 with 7, 1 with 10), lower mental 2, lateral line 17–22.

Comparative analysis of all available *Bathychaunax* specimens of course results in three possible hypotheses: 1) all morphologically similar *Bathychaunax* populations are conspecific; 2) each of the three morphologically similar *Bathychau-*

nax populations represents a distinct species; or 3) *B. coloratus* and *B. roseus* are distinct, and the former occurs in both the eastern Indian Ocean and the eastern Pacific. Available data indicate the third hypothesis is the most highly corroborated and it is thus the one proposed herein. The reasoning that led to this conclusion is as follows: The hypotheses that *B. coloratus* and *B. roseus* are distinct species have been proposed by Garman (1899) and Barbour (1941) respectively. To refute Barbour's (1941) hypothesis and support an argument for conspecificity of eastern Pacific and western Atlantic populations, *B. coloratus* must be represented by more than the single mutilated eastern Pacific specimen (Caruso, 1989). It follows, therefore, that the same criterion must be met to demonstrate the morphologically similar population of the eastern Indian Ocean is distinct. The latter must therefore be provisionally considered conspecific with *B. coloratus*. Additional eastern Pacific *Bathychaunax* material will hopefully help corroborate one of the three possible hypotheses.

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NOTE ADDED IN PRESS: During a recent cruise of the Soviet vessel VITYAZ, at least two specimens of *B. melanostomus* were collected in the western Indian Ocean at a depth of approximately 2,600 m (VITYAZ Station 2779, 30°30.0'-25.0'S, 46°53.0'-47°00.0'E; 2580-2680 m, 29 m ST, 26 Dec. 1988, 1335-1910 hrs.). This identification is based upon an excellent photographic transparency kindly provided by M. E. Anderson.

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